Sanitized Copy Approved for Release 2011/09/19 : CIA-RDP78-03424A002000070011-2

25X1

CONFIDENTIAL

PROPOSAL FOR R&D ON GOVERNOR CONTROL FOR MINIATURE MOTOR

The object of the research would be to improve on a governor system to hold a miniature motor at approximately 2000 RPM or in that range as desired. The present approach utilizes a centrifugally controlled contact spring member which opens the armature current when the motor reaches a pre-determined speed. The problem is that the contact is of such light force and so momentary along with being greatly affected by temperature and other considerations that the regulation is relatively poor.

It is our thought that a further study should be made on the contact material, the spring material of the governor, and the entire approach and velocity of governing such a motor at these lower speeds. Certainly, it is difficult to take a standard motor designed for high speed governor control and have it come out as satisfactory in the lower speeds as can otherwise be obtained.

Our approach would be to study the following and make a prototype motor with any improvements that these studies produce.

1. Evaluate the contact material used on the governor.

2. Select a zero coefficient spring material that would be unaffected by the temperature ranges necessary.

3. Study the application of a mass or weight added to the spring at the desirable point to be more effective at the lower RPM over which the motor is to be governed.

4. Evaluate between the present concept of armature speed control which consists of opening the contact by centrifugal force when the motor has reached a certain speed versus a field control wherein one field is of permanent magnet design, which basically supplies the necessary field for operation, with a second field which is wound and controlled by closing a contact when the motor reaches a certain pre-determined speed.

5. Evaluate the friction losses in having the present concept design use brushes or wiper contacts on the governor versus having the governor attached to a mid section of the armature winding without the use of any wiping contacts. The friction losses in this case become appreciable and, if nothing is accomplished by having this method of feeding the governor, then it should be eliminated.

6. Using the field control will still require a wiping contact to the governor; so, consideration will have to be given as to the friction loss versus the speed control.

7. Either design the motor to more effectively confine the external field or work out a shielding method as a part of the motor to eliminate the stray field from disturbing properties.

8. In any approach on the motor, all consideration will be made as to acoustical noise which is caused by the commutator bars passing the brushes along with the contact noise of the governor itself.

25X1

CONFIDENTIAL

Sanitized Copy Approved for Release 2011/09/19 : CIA-RDP78-03424A002000070011-2

ILLEGIB
Sanitized Copy Approved for Release 2011/09/19 : CIA-RDP78-03424A002000070011-2

Page Denied

Sanitized Copy Approved for Release 2011/09/19 : CIA-RDP78-03424A002000070011-2

Sanitized Copy Approved for Release 2011/09/19 : CIA-RDP78-03424A002000070011-2

1/28/59

CONFIDENTIAL

COST ESTIMATE

R&D ON GOVERNOR CONTROL OF DC MOTOR

DESCRIPTION:

The project covers the design of a governor for relatively low speed control of a permanent magnet DC motor. The costs include any fabrication necessary on a motor as well as the governor along with the different types of materials used in the governor and the motor itself.

Engineering costs:	$2,218.87
Project engineer	
Junior engineer	
Design draftsman	
Technician	
Machine Shop:	560.01
Model maker	
Machinist	
Lathe operator	
Material:	136.85
Raw materials	
Purchased parts	
Outside processing	

COST SUMMARY

Engineering labor cost	$2,218.87
Machine Shop cost	560.01
Material cost	136.85
Total Cost	$2,915.73
8% profit	233.26
Total Selling Price	$3,148.99
Estimated packing & shipping chgs.	10.00
Grand Total	$3,158.99

NOTE: The above labor is covered with 81% burden and 19% G&A.

This price quotation valid 60 days from date. Equipment f.o.b. destination. Additional prototypes in lots of 1 to 5 - estimated $150.00 each.

Production quantities of this motor would be tooled to meet the production requirements and the prices appreciably lower as a function of tooling.

CONFIDENTIAL

Sanitized Copy Approved for Release 2011/09/19 : CIA-RDP78-03424A002000070011-2

Sanitized Copy Approved for Release 2011/09/19 : CIA-RDP78-03424A002000070011-2

25X1

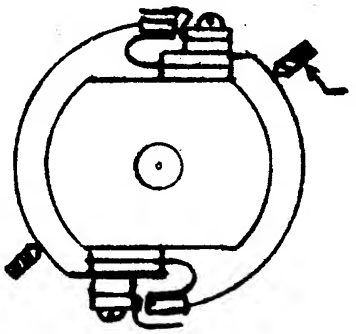
INFORMAL STATUS REPORT

Governed Speed Motor

All mechanical parts are now made and the armature is wound with the first estimated winding. From this winding, tests will be made to determine the voltage at which the motor functions per spec as to watts, amps, speed and torque. From this voltage, we will calculate the final winding configuration and brush position.

The governor parts were completed 21 August 1959 with the exception of the silver contact buttons. When these are finished and attached to the governor spring, the resonant frequency of the spring-mass combination will be taken. If this is equal to the rpm within 15%, we can assemble the governor. The governor and final winding will then be tested with the shading coils for conformance with the spec.

In order to obtain a resonant frequency at the rotor speed, it was necessary to make a leaf spring covering 115° of arc at the largest possible diameter to keep from going to impossibly thin stock. Therefore, the layout of the governor is changed from the last report by shortening the lengths of the two N.C. and N.O. contacts as shown below.



For a governor of this type to function the best, the leaf should go into resonance at the governing frequency. When this happens, the normally closed contacts will vibrate and open a great deal more than if only centrifugal force were operating on them. This will enable them to move far enough to close the normally open contacts.

The schedule for this motor is as follows:

Week of Aug. 25-28	Motor Tests
Aug. 31-Sept. 4	Motor Rewind and Governor Tests
Sept. 8-11	Governed Motor Tests
Sept. 14-18	Adjustments and Retest
Sept. 21-25	Test Conformance to Environmental Requirements
Sept. 31	SHIP

Sanitized Copy Approved for Release 2011/09/19 : CIA-RDP78-03424A002000070011-2

Sanitized Copy Approved for Release 2011/09/19 : CIA-RDP78-03424A002000070011-2

Motor Governor

25X1 [redacted] is handling the design work on this project. Two approaches are being taken: 1) a governed field design and 2) a governed rotor. The Dalmotor furnished as a sample cannot be used in either case as it does not have a wound field and has its armature governor on the wrong end of the shaft for the armature regulation we plan to use.

The field governed design will have the major part of the flux supplied by permanent magnets. Aiding or buacking coils will be wound around the PM poles and will be energized by the governor contacts.

The armature governed design will have a double contact governor which will place a resistor in series with one armature coil when the contacts open.

The spring material for the centrifugal blades is being investigated and samples procured. Elgiloy, a watch spring material made by the Elgin National Watch Company, appears to have the necessary properties for this application.

Parts will be in the shop for the two motors by June 19, 1959.

Conclusion

We request a 30-day extension due to the delays in obtaining the new motor lamination punchings and the deeper case for the #3 Recorder. All other projects will be completed on schedule. We do not require additional money for the time extension as no extra funds were expended during the delayed period.

These data obtained from an internal report from [redacted], Chief Engineer, R ar25X1 Section.

Sanitized Copy Approved for Release 2011/09/19 : CIA-RDP78-03424A002000070011-2